Visual Link Software

Your process, your control

Manufacturing Execution System: easy as pie?

MES explained in eight modules

Summary

Running a business in the process industry means looking ahead, making the right choices and implementing flexible adjustments on the fly. You can only do this when you possess the right information at the right time. Factual insights into your current production process allow you to chart the best course towards the future. A Manufacturing Execution System (MES) gives you these insights. With Visual Link Software (VLS), the software engineers at Hellebrekers Industrial Automation have developed their own unique MES system. VLS|MES is a software package that connects your office software (e.g. ERP, Exact or SAP) to that of your production environment (SCADA and machine control). As an entrepreneur, VLS|MES helps you gain more control by providing you with factual and real-time information throughout the entire production process. This invaluable information puts you back in the driver's seat, allows you to look ahead and helps you further optimise your production process.

In this brochure, we will take a closer look at the production process of the fictional company Pie-2-Go, which produces different types of pies. We will take you on a journey from the initial order to the final production, explaining the different functionalities of VLS|MES along the way. To simplify matters, we have divided our software into eight main components. This makes the system as a whole less complex and provides insight into the added value that VLS|MES can offer you as an entrepreneur. We hope that MES will be easy as pie for you after reading this brochure.

TABLE OF CONTENTS

INTRODUCTION

Pie-2-Go is a medium-sized production company that produces half a million pies every year. The company began by producing three different types of pies ten years ago. Over time, ERP was implemented in the office environment and the production floor began using SCADA and other production-related software packages.

The company's pies are a massive success and the machine pool is expanded in order to meet the growing demand. The demand for more flavors and different sizes also grows rapidly, which increases the number of recipes that the company works with. On top of that, Pie-2-Go has to comply with increasingly strict occupational health and safety laws and food safety regulations. In light of all these factors, it is clear to the board that the company's current method of manually processing information is becoming untenable.

Pie-2-Go began looking for a solution and came into contact with VLS|MES, a Manufacturing Execution System developed by Visual Link Software. Although it was possible to implement the system in a phased manner, i.e. one module at a time, the board decided to implement the entire system all at once. That proved to be a wise decision in hindsight: the new insights resulting from the digitization process have given Pie-2-Go more control over its own production process.

The company has become more flexible, it can respond fas
to new requests from clients, it can make more effective us
its machine pool and the increased production has resulted in
higher revenue figures.

Below, you can follow a client's order as it moves through all
eight components of VLS|MES.
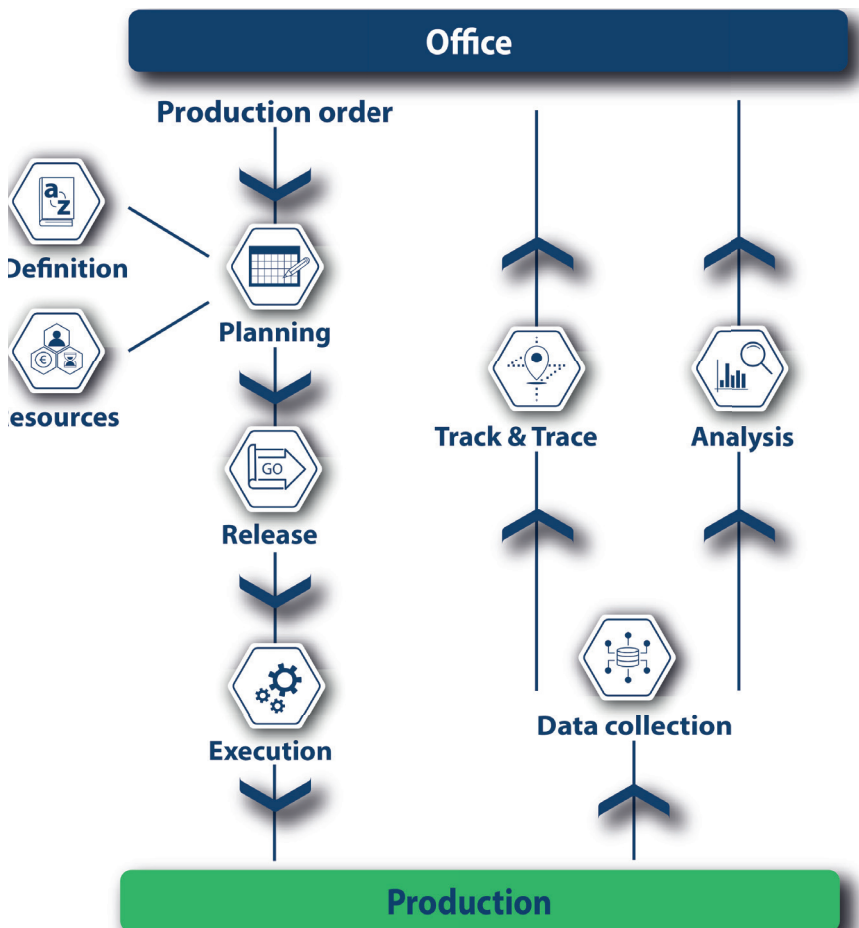
1. PLANNING
From order to production planning

A client places a specific order with Pie-2-Go. They want to receive 1,000 apple pies with raisins with a diameter of 24 centimetres within five working days. The order is entered into the order handling system and it is automatically added to VLS|MES' Planning module. There, the order is assigned a unique order number and product code.

The Planning module translates the overall order into a detailed production planning, down to the hour and minute level. Besides the current order, all other orders are taken into account as well and the module will come up with the most efficient production method.

Planning gives Pie-2-Go insight into how the theoretical planning relates to its real-life implementation. This allows the company to take appropriate action on the fly. If an unexpected error occurs on a production line, the operator can check the Planning to see if any alternative options are available and if so, what these options are.

2. DEFINITION
From production planning to composition

In the database of the Definition module, it is recorded exactly how each individual pie should be produced. It defines what ingredients are required, what auxiliary equipment is needed and what machine settings to use.

Since all these data and settings are already recorded in the system, no manual intervention is needed once an order is placed. This guarantees a uniform quality for the final product.

It also helps reduce human error throughout the process. Lastly, all steps in the process are known, so none are skipped along the way.

In the past, the wrong ingredients were sometimes used when recipes were entered manually. Thus far, the damage was limited to small batches, but Pie-2-Go was eager to eliminate this risk entirely. The Definition module now ensures that the correct ingredients are used for each order.

3. RESOURCES
People, assets and materials

HThe Resources module combines and processes information about the availability of staff, production lines, machinery and inventory in real time. Pie-2-Go could have opted not to use this module. After all, it is possible to rely on manual inventory management, although this is often a time-consuming process that is prone to error.

Since Pie-2-Go did implement the Resources module, it can now check its inventory levels at any time and determine whether sufficient staff are available. The module also ensures that the available materials and the production lines are used optimally.

After implementing the Resources module, Pie-2-Go was able to increase the utilization rate of its machine pool by no less than 15%.

4. Release
Traffic controller

This module is best seen as the traffic controller for the order. It checks whether all conditions have been met with regard to Pie-2-Go's order. For example:

- Has the correct recipe been entered (for an apple pie with raisins);
- Has the correct number been entered (1,000 pies with a safety margin);
- Are all necessary production lines available and ready for use;
- Are all resources available to complete the entire production run;
- Will the scheduled run time allow us to meet the delivery date.

When all conditions have been met and the production process can begin, the Release module will give the green light (in ISA-95 terms: Dispatch).   This MES module gives Pie-2-Go the assure that there will be no further delays during the production process because all preliminary conditions for the production are met.

In the past, Pie-2-Go would sometimes find out halfway through a production run that it did not have enough of a certain ingredient in stock. This was often the result of an incorrect estimate by the operator or erroneous inventory management. Today, a production run cannot begin until all conditions have been met. This final check ensures there are no more nasty surprises once production has begun.

5. EXECUTION
Managing the production floor

Once there are green lights across the board, the operator can begin the production process via the Execution module. VLS|MES facilitates a direct connection to the machine controls and allows for remote management. The latter means that the operator no longer has to stand next to a machine to set it running. This option also makes it possible to review malfunctions and come up with a solution from anywhere.

Given the fact that Pie-2-Go's production continues 24/7, operators often had to visit the factory in person to resolve a malfunction. Remote access now allows them to review the issue via a tablet and come up with a solution, all from the comfort of their own home.

Being able to control its production processes remotely saves Pie-2-Go a wealth of time. On average, it allows the company to save one FTE per full week. Furthermore, it is no longer necessary to have multiple operators physically present on site at the same time.

6. DATA COLLECTION
Basis for Analysis and Track & Trace

During the production process, a wealth of data is generated in real time. If these data are not stored, they are lost and can be of no further value to the organization. The Data Collection module gathers all available data from the production lines. This concerns data pertaining to e.g. the speed of the lines (uptime), downtime, losses, waste, use of additives and the number of rejected and approved products.

In addition to machine-generated data, all data entered by the operators prior to and during the production process are also recorded. Think of e.g. textual input or images. When a product is rejected, a tablet is used to take a picture of the product in question and describe the exact nature of the complaint. All this information is recorded in the database. Exactly what data should be collected is always determined in close conference with the client.

The Data Collection module adds all data to a powerful database. Next, the Analysis and Track & Trace modules can extract valuable information from these data with the help of smart software applications.

7. ANALYSIS

Extracting valuable information from vast quantities of data

Data in and of themselves are not particularly useful. Only by analyzing the information can you use it to take measures immediately (in real time and on site). One example of real-time feedback is the direct adjustment of the production process based on e.g. the OEE (Overall Equipment Effectiveness) or the predefined KPIs (Key Performance Indicators).

Furthermore, a good analysis makes it possible to anticipate issues during subsequent production runs (near-real-time, based on production and weekly reports).

The Analysis module quickly revealed to Pie-2-Go that it was not making optimal use of the availability of its production lines. With a smarter order planning, MES helps the company to make optimally efficient use of its existing machine pool.

8. TRACK & TRACE
Insight into order status and traceability

Every aspect of the entire production process is recorded in the database of VLS|MES. As a result, the Track component of this module makes it possible to find out where an order is in the process.

Trace, meanwhile, ensures that all ingredients and other resources used for the production of each individual pie can be traced back to their source. Every component has a product code or falls under a certain batch or lot number. In the event of a complaint or recall, a few clicks is all it takes to find out what resources were used, under what conditions these were processed (the process parameters) and where they came from.

Companies in the food industry have to meet extremely strict food-safety requirements and they are frequently audited by the Netherlands Food and Consumer Product Safety Authority (NVWA). In the past, it would take at least three days to gather the information required for each audit. Today, Pie-2-Go's quality manager can submit the correct documentation with just a few clicks.

Conclusion
MES... Easy as pie?

Although Pie-2-Go is a fictional company, this case accurately depicts the reality of many organizations in the (food) process industry. Implementing MES software can be a major step towards process optimization for your company as well.

Although Pie-2-Go opted for a complete implementation, a phased implementation is also possible in most cases. For example, you could start by digitizing your Planning in combination with the Release and Execution modules. This will make a large part of your production process less dependent on people and less prone to errors. The other modules can be implemented at a later stage, allowing you to gradually optimize all other aforementioned processes as well. Note that not all MES software can be implemented in phases. It is important to keep that in mind when comparing different MES packages.

Is the conclusion of this document that MES is easy as pie? Of course, there is a bit more to it than that, but we do hope that reading this brochure has given you a better idea of what MES is and the good it can do for your organization.

Contact

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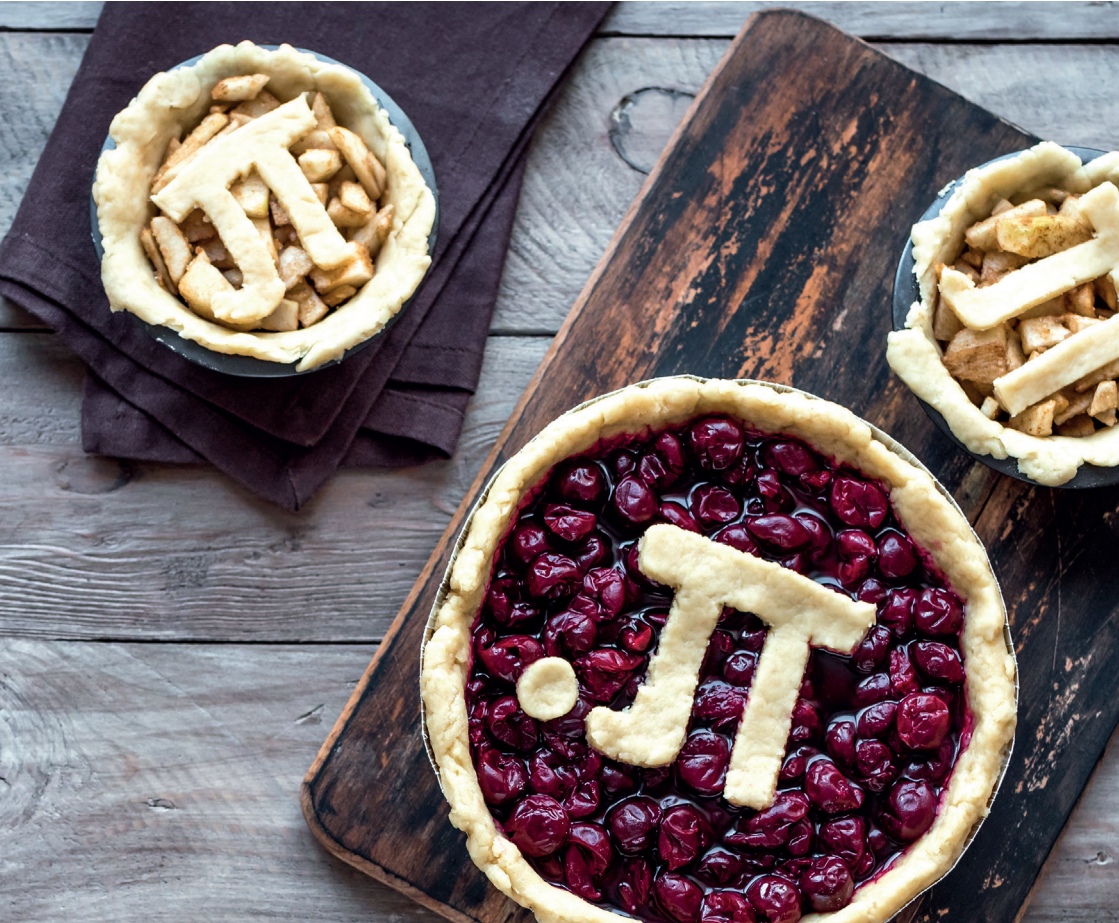T. 088 45 68 000
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Your process, your control